In the Claims

The status of claims in the case is as follows:

1.   [Currently amended] A computer implemented method for detecting denial of service attacks, comprising the steps of:

> issuing a bit encoded login challenge in response to a login request to said computer from a requester of services; and

> responsive to an incorrect response to said challenge, said computer placing said requester in a state of limited service.

2.   [Currently amended] The computer implemented method of claim 1, further comprising the steps of:

> filtering out to said state of limited service iterative connection requests from a network address of a hacker device.

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3.   [Currently amended]   The <u>computer implemented</u> method of claim 1, further comprising the step of:

responsive to speed, latency and average queuing network delay of connection requests, detecting and placing in a state of limited service repetitive login requests from a hacker device.

4.   [Currently amended]   The <u>computer implemented</u> method of claim 3, further comprising the steps of:

determining from said speed, latency and average queuing network delay a time-out value; and

detecting as a request from a hacker device a request that does not complete within said time-out value.

5.   [Currently amended]   The <u>computer implemented</u> method of claim 1, further comprising the steps of:

issuing further challenges to subsequent requests for service from said requester and selectively responding to successful responses by continuing service at the same or improved level and to unsuccessful responses by

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further reduction or complete denial of service.

6.   [Currently amended] The <u>computer implemented</u> method of
claim 1, further comprising the steps of:

    periodically issuing said challenges throughout

    connection to a requester successfully responding.

7.   [Currently amended] The <u>computer implemented</u> method of
claim 1, comprising the step of issuing said bit-mapped
challenge as logon image from which a user must select or
enter a response.

8.   [Currently amended] The <u>computer implemented</u> method of
claim 7, further comprising the step of occasionally
shifting the input area for a valid response to said
challenge.

9.   [Currently amended] The <u>computer implemented</u> method of
claim 1, further comprising the step of slowing acceptance
from and response to systems in a degraded service category.

10.   [Currently amended] The <u>computer implemented</u> method of
claim 1, further comprising the step of counterattacking by

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executing a denial of service response to attacking systems.

11.   [Currently amended]   A computer implemented method for detecting denial of service attacks, comprising the steps of:

executing a bit-encoded challenge-response login procedure and a network probing test frame transmission and analysis procedure to detect a hacker denial of service attack;

said network probing test frame transmission and analysis procedure including defining a signature of discrete speed, streaming speed, and latency of the connecting device failing said bit-encoded challenge-response login procedure, and adding said signature to a router based filter for filtering out login requests from said hacker responsive to said signature; and

responsive to detecting said denial of service attack, placing said hacker in a lower level of service state.

12.   [Canceled]

13.   [Canceled]

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14.   [Canceled]

15.   [Currently amended] A <u>computer implemented</u> method for detecting denial of service attacks, comprising the steps of:

    selecting sending and receiving probative test packets through a network;

    responsive to said packets, determining network evaluation parameters for said network;

    responsive to said network evaluation parameters, determining presence of network denial of service attacks, said network evaluation parameters including response time and throughput characteristics of said network, said throughput characteristics including capacity, utilization, and performance; and

    executing a challenge-response procedure to discourage and repel said attacks.

16.   [Currently amended]   The <u>computer implemented</u> method of claim 15, further comprising the steps of:

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determining a latency and speed fingerprint of an
offending device;

responsive to said fingerprint, operating a router
filtering system to reject packets from said offending
device.

17.   [Currently amended]   The computer implemented method of
claim 16, said fingerprint comprising a rhythm of
transmissions of discrete, burst, and stream packets.

18.   [Currently amended]   A computer system for detecting
and responding to denial of service attacks, comprising:

a test station for identifying a zombie source of said
denial of service attack;

a low quality server for serving said zombie source;
and

a high quality server for serving legitimate sources of
request for services.

19.   [Currently amended]   The computer system of claim 18,

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further comprising:

a load balance server for directing said zombie source
to said low quality server.

20.   [Currently amended]   The computer system of claim 19,
said zombie source being [[an]] a server addressable on an
Internet containing trojan-horse code.

21.   [Currently amended]   The computer system of claim 18,
said test station performing testing by use of ICMP pings to
identify said zombie source.

22.   [Currently amended]   The computer system of claim 21,
said test station further for determining patterns of
traffic generated by well-known attack scripts for
subsequent use in identifying said zombie source.

23.   [Currently amended]   The computer system of claim 21,
said test station further for determining a timeout value
for completion of a login request for freeing control blocks
responsive to a login request which does not complete within
said timeout value.

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24.   [Currently amended]   A <u>computer implemented</u> probative
test and analysis method for detecting and responding to
denial of service attacks on a network resource, comprising
the steps of:

creating a template of attack patterns;

determining historical, current, and predicted states
of said network for each of a plurality of types of
network traffic;

responsive to said attack patterns, determining if a
spike in network traffic is a distributed denial of
service attack and, if so, determining its source; and

denying full service to sources associated with said
service attack.

25.   [Currently amended]   The <u>computer implemented</u> method of
claim 24, further comprising the steps of:

determining unique speed and latency network attachment
characteristics of devices attempting to connect to
said network resource; and

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responsive to detection of an abusive behavior from a
said device, responding to subsequent requests for
service from said device by denying said full service
to said device.

26.   [Currently amended]   A ~~computer~~ program ~~product~~ ~~storage~~
~~device readable by a machine, tangibly embodying a program~~
~~of instructions executable by a machine to perform method~~
~~steps~~ for detecting denial of service attacks, ~~said method~~
~~steps~~ comprising:

a computer readable medium;

first program instructions to ~~issuing~~ issue a bit
encoded login challenge in response to a login request
from a requester of services; [[and]]

second program instructions, responsive to an incorrect
response to said challenge, ~~placing~~ to place said
requester in a state of limited service; and wherein

said first and second program instructions are recorded
on said computer readable medium.

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27.   [Canceled]

28.   [Canceled]

29.   [Canceled]

30.   [Currently amended]   A computer program product storage
device readable by a machine, tangibly embodying a program
of instructions executable by a machine to perform method
steps for detecting denial of service attacks, said method
steps comprising:

   a computer readable medium;

   first program instructions for executing a network
   probing test frame transmission and analysis procedure
   to detect a hacker denial of service attack; [[and]]

   second program instructions, responsive to detecting a
   denial of service attack, for placing said hacker in a
   state of lower level of service; and wherein

   said first and second program instructions are recorded
   on said computer readable medium.

31.   [Newly added]   A computer program product for detecting

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denial of service attacks, comprising:

a computer readable medium

first program instructions to selectively send and
receive probative test packets through a network;

second program instructions, responsive to said
packets, to determine network evaluation parameters for
said network;

third program instructions, responsive to said network
evaluation parameters, to determine presence of network
denial of service attacks, said network evaluation
parameters including response time and throughput
characteristics of said network, said throughput
characteristics including capacity, utilization, and
performance;

fourth program instructions to execute a challenge-
response procedure to discourage and repel said
attacks; and wherein

said first, second, third, and fourth program

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instructions are recorded on said computer readable medium.

32. [Newly added] The computer program product of claim 26, further comprising:

third program instructions for filtering out to said state of limited service iterative connection requests from a network address of a hacker device; and wherein

said third program instructions are recorded on said computer readable medium.

33. [Newly added] The computer program product of claim 26, further comprising:

third program instructions, responsive to speed, latency and average queuing network delay of connection requests, for detecting and placing in a state of limited service repetitive login requests from a hacker device; and wherein

said third program instructions are recorded on said computer readable medium.

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34.   [Newly added]   The computer program product of claim
26, further comprising:

third program instructions for determining from said
speed, latency and average queuing network delay a
time-out value;

fourth program instructions for detecting as a request
from a hacker device a request that does not complete
within said time-out value; and wherein

said third and fourth program instructions are recorded
on said computer readable medium.

35.   [Newly added]   The computer program product of claim
26, further comprising:

third program instructions for issuing further
challenges to subsequent requests for service from said
requester and selectively responding to successful
responses by continuing service at the same or improved
level and to unsuccessful responses by further
reduction or complete denial of service; and wherein

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said third program instructions are recorded on said computer readable medium.

36.   [Newly added]   The computer program product of claim 26, further comprising:

third program instructions for periodically issuing said challenges throughout connection to a requester successfully responding; and wherein

said third program instructions are recorded on said computer readable medium.

37.   [Newly added]   The computer program product of claim 26, further comprising

third program instructions for issuing said bit-mapped challenge as logon image from which a user must select or enter a response; and wherein

said third program instructions are recorded on said computer readable medium.

38.   [Newly added]   The computer program product of claim

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37, further comprising

fourth program instructions for occasionally shifting the input area for a valid response to said challenge; and wherein

said fourth program instructions are recorded on said computer readable medium.

39. [Newly added] The computer program product of claim 26, further comprising

third program instructions for slowing acceptance from and response to systems in a degraded service category; and wherein

said third program instructions are recorded on said computer readable medium.

40. [Newly added] The computer program product of claim 26, further comprising

third program instructions for counterattacking by executing a denial of service response to attacking

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systems; and wherein

said third program instructions are recorded on said computer readable medium.

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